

The 13th Annual General Assembly of the IAMU

**Expanding Frontiers -
Challenges and Opportunities in Maritime Education and Training**

**The role of teamwork abilities and leadership skills for
the safety of navigation**

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Abstract: Today it is well known that almost 80 percent of maritime accidents are based on human factors and human failures in managing different activities onboard ships. At the same time, experts have recognized the importance of teamwork in almost all activities realized onboard ships. As an extension of this principle, the teamwork needs a leader in order to be well done. So, we can consider that failure or missing teamwork and leader skills onboard ships can lead to accidents. Consequently, the following question arises, when is the right moment for development of teamwork abilities and leadership capabilities for a person who wants to work at sea? According with some studies in the field, teamwork concept can be seen as a cognitive human behavior, more or less recognized by the person involved in such activities. This cognitive behavior is given by the social nature of human beings since people do not live or work alone. Leadership is a skill possible to be cognitive to some persons, but in most of the cases it must be cultivated in order to bring maximum results.

Starting from actual attention give by International Maritime Organization through the 2010's Manila Amendments to teamwork and leadership and from considerations presented before, we tried to realize a study about the level of presence of these abilities in our students. For the aims of the present analysis we used students from the last year of study, and simulation techniques to generate situations which required work in team and leadership skills. The evaluation of these capabilities have been made through observation of different usage levels of knowledge, communicative skill, personal behavior, interpersonal relationship, commands and response time and adherence to team principles, something like "one for all, all for one". For leadership evaluation, one student from every team used in the study, was nominated as team leader and was observed to see if he or she had the skills to coordinate and conduct the team to achieve the designated application target.

The results that will be presented in this paper will show how students understand the

teamwork principles, how they take decisions as a team, and, how much everyone's personality affects the team activity. The results will also show how the role of a leader is perceived, how every person develops his/her own leadership skills and how to apply these skills in the conduction of a team on the bridge of a ship. These results allow us to create a percentage statistic for every type of leader according to the studied person abilities, and to tabulate, also in percentages; the problems appearing in a teamwork activity.

Keyword: human factor, teamwork, leadership, ability, skill, STCW Convention, safety

1. Introduction

“Safety first”, a well known expression onboard all ships, must be treated as a principle, not only as advice. It must be the main concernment of all seafarers during their activity. Making reference to the working on sea, we can say that “Safety will bring you back home”. Onboard ships the safety concept can be developed under many aspects like: safety on the bridge, safety in the engine room, safety of navigation, safety on deck, safety at maneuvering, safety operation and in all activity with supposed human participation. Some of these safety concepts are more than simple actions to prevent unforeseen events, they are complex activities in order to assure protection against all possible dangerous events for persons, ship and environment.

Many of the activities which take place onboard are collective activities and suppose the participation of more than two of crew members. Also, safety onboard is an individual and collective matter, because any imprudent action of an individual can affect all crew members. From this point of view, the expression about safety to be used onboard must be “What is safe for me is safe for others”. This opinion can be seen at the same time as the basic support of the teamwork and as main principle of collective activities.

With all these considerations regarding safety, accidents which involved human factors still happen. Thus not only the development of safety concepts help in accident prevention. An important aspect which has to be take account when talking about people is the social nature of human being which means that humans are more attracted by the collective working tasks, than by sole ones.

When the work is done by a team, a leader has to exist to control and coordinate the entire activity. In this situation, according with rules and procedures, the leader is nominated by rank - the person with the higher rank is considered to be the team leader. But, the rank doesn't give leadership skills, these must be achieved and proved. To be a leader means to be appreciated and respected by the others and to be able to coordinate their activity in a safe manner.

If teamwork can be considered as a cognitive behavior of human beings, leadership is a skill which has to be developed in time for most of the people. In activities which take place onboard ships both are important and have to be well known and applied.

Studies about human behaviors have shown that teamwork ability is in a close relation with each individual's personality. Personality will determine the interrelation with other people, interpersonal communication and reaction to the actions of other. Knowing the personality can offer the possibility of knowing how to create a team, or what people can stay together to form a team. In many situations, knowledge about each individual personality and own social interaction style can lead to avoidance of conflicts. On ships is important to know how to form a team for a particular activity and how to manage each member's personality in order to reach the team target. The leader, as part of the team, is subject to the same personality conditions. But beyond this the leader needs to be able to interact and communicate with all team members, in

all situations, and to be able to lead the team in difficult moments, during distress or dangerous situations.

In order to state the importance of these abilities during onboard activities, the International Maritime Organization [1] has decided to introduce specialized training to encourage the development of these abilities in seafarers, especially for officers at the management level. For this reason, during the 2010 Manila Conference, one of the subjects discussed was the introduction of the new requirements for training of knowledge about teamwork and leadership. At the same Conference, assertiveness training for all seafarers was also included, given its importance not only for those who have to direct operations but also for those in lower grades who may have to communicate on safety matters with senior officers and Master of the ship.

As part of the maritime training system, and of the maritime industry, universities have to know and to introduce in their curricula the requirements stated by International Maritime Organization and by other bodies of the maritime sector. Training on these matters has to give the future officers the capabilities to understand the meaning of team work and to be able to manage activities in collective organizations. A rigorous development of these skills through training will contribute to the increasing of the level of safety for all aboard ship activities.

2. Role of teamwork aboard ships

The human society is based on cooperation and interaction. Without these characteristics it will not be possible to generate development and wellbeing. Through bringing of this concept onboard ship, it can be considered that the ship is the society and seafarer is the individual who needs to add value at the wellbeing of the entire society. Inside of this consideration, onboard, is born the idea of “one for all and all for one”. This idea leads to the unity of the crew and to the principle of teams working. Working together means teamwork and the successfully applying of this principle depends by the rules respected.

Studying the entire activity which takes place onboard ship it is easily seen that it is almost entirely based on teamwork, or, that every activity requires a supposed minimum two people for completion. In a working environment like ships, teamwork can be the way for a safe activity. When an operation is covered by more than one person, the safety level has increased through a second or more peoples involvement.

The complexity of most of the onboard operations places them beyond the control of one individual, and the only efficient way to tackle process improvement is through the use of teamwork. Teamwork has many advantages [4], like:

- a greater variety of complex issues can be tackled by pooling expertise and resources;
- problems are exposed to a greater diversity of knowledge, skill and experience;
- the approach boosts morale and ownership through participative decision making;
- improvement opportunities that cross departmental or functional boundaries can be more easily addressed;
- the recommendations are more likely to be implemented than if they come from an individual.

In order to generate improvement and to increase the safety onboard, teamwork must be driven by a strategy, have a structure and be implemented thoughtfully and effectively. The crew members will not engage in continuous improvement activities without commitment from superior officers, including the Master, a culture for improvement and an effective mechanism for capturing individual contributions. From this point of view, the officers have a great re-

sponsibility in the development and correct application of teamwork principles, being directly involved in supervision of all activities. The ship Master has also an important role in development of the teamwork environment; using the power of examples he can inspire and direct the teamwork activity in a safe manner. In many of the ship operations, the Master's presence is compulsory, for the supervision of the entire operation and to stimulate the crew to complete their tasks according with the safety principles [5].

When properly managed and developed, teamwork improves operations and produces results quickly and economically through the free exchange of ideas, information, knowledge and data. It is an essential component of a building trust process, improving communication and developing a culture of interdependence, rather than one of independence.

A team, like any other organization form, needs to have a structure to comply with the targets. The general structure of a team comprises the following components: co-ordinator, shaper, plant, monitor-evaluator, implementer, resource investigator, team worker and finisher. This structure can be modeled according with the team target and activity field. It is not essential that a team comprise eight people each fulfilling one of the positions above, but the people who are aware and capable of carrying out these positions should be present. In small teams, people can, and do, assume more than one position. Studies about team structure and performance, using these position concepts, can lead to improvements, as example:

- underachievement demands a good co-ordinator or finisher;
- conflict requires a team worker or strong co-ordinator;
- mediocre performance needs a resource investigator, innovator or shaper;
- error prone teams need an evaluator.

Different positions are important in different circumstances. For example new teams need a strong shaper to get started, competitive situations demand an innovator with good ideas, and in area of high risk, such as ships carrying dangerous cargoes or during operations which involve risks, a good evaluator may be needed. Teams should, therefore, be analyzed both in terms of what team positions members can take, and also in relation to what team skills are most needed. Despite having well defined positions within a team, the interaction between the different personalities of individuals can be a frequent source of friction. However, this can largely be avoided by understanding and valuing people's differences. [4]

Teams with a well defined structure and members' personalities and behaviors known should be characterized by:

- clear objectives and agreed performance goals;
- openness and confrontation;
- support and trust;
- co-operation and conflict;
- good decision making;
- appropriate leadership;
- review of the team process;
- sound inter-group relationships;
- individual development opportunities.

3. Leadership styles and ship safety

In general terms, leadership can be defined as the art of motivating a group of people to act towards achieving a common goal. For some people leadership is a cognitive behavior, but for most of the people it needs to be acquired. For both groups, leadership behavior is influence by

the leadership style, which is categorized in four types, but modeled by each individual according with own personality. In order to decide what kind of leader a person is, it is necessary to include this person in a leadership style. Developing this appreciation about leader type through leadership style, it might be possible to deduct how the nominated person will approach the safety matters.

According with the researchers, the most basic leadership styles are: autocratic, bureaucratic, laissez-faire and democratic [2]. These are the main leadership types which can be applied to all human activities, including the maritime sector. Taking into account the particularities of the maritime activities it is important to be known how these classifications can be used for those persons who work on ships. In this way, to start with it we need to define every leadership style, including characteristics, effectiveness and ineffectiveness, and after to be modeled for ship working environment.

The first, autocratic leadership style, is considered in most of the cases as the classical approach. In it the leader retains as much power and decision-making authority as possible. The leader does not consult the team members, who are not allowed to give any input. In this case the leader asks to the team to obey orders without receiving any explanation. Motivation is produced by creating a structured set of rewards and punishments [3]. According with these considerations, autocratic leaders:

- rely on threats and punishment to influence the team;
- do not trust the team members;
- do not allow for others input.

On the other hand, sometimes this style is not complete bad and can be most effective in situations when:

- team members are new onboard and not-familiarized with the ship and do not know tasks to be performed or procedures to be follow;
- for a successfully operation it is necessary to provide effective supervision through detailed orders and instructions;
- the team members do not respond to any other leadership style;
- a decision is necessary to be taken in a short period of time;
- the teams have a multicultural structure and leader's authority is challenge by a member of the team.

Anyway, leaders who adopt this style have to know there are situations when the autocratic style is not recommended, like: the team becomes tense, fearful or resentful; team members expect to have their opinion heard; or, members of the team begin depending on their leader to make all their decisions.

The second style, bureaucratic, is where the leader make everything like in the manual or strictly following the procedures. In case a situation is not covered by the procedures or policies, the leader refers the decision to the next level above him. This type of leader is more like a "police officer" who enforces the rules.

This leadership style proves its effectiveness in situations when:

- the team is performing routine tasks;
- team members need to understand certain standards or procedures;
- the team operates with dangerous or hazardous materials or delicate equipment;
- conducting onboard training on safety or security;

This leadership style can be ineffective when:

- team members lose their interest in their jobs
- team do only what is expected of them and no more.

The democratic leadership style is called the participative style and is characterized by [2]:

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- involving the team members in planning and carrying out operations;
- asking before telling, valuing team discussion and input;
- promoting a sense of teamwork, encouraging participation and wise delegation, but never losing sight of responsibilities as a leader;

The democratic leadership style is most appreciated in all activities, including those on-board ships, and it stimulates the team to improve their capacities and helps to increase ship operability and safety as well as allowing a team to function in the absence of the leader [6].

This leadership style is effective when:

- the time for the operation is not limited;
- team members have some degree of skill or knowledge;
- the leader is well familiarized with the operation and wants to create a strong team;
- the team is motivated and the sense of team exists to gain more commitment.

This style is ineffective in situations when:

- team members lack skill and knowledge;
- motivation is missing;
- between team members is a conflict state.

The last leadership style, laissez-faire, is known as “hands-off” style, in which the leader provides little or no direction and gives team as much freedom as possible. In this situation, all authority is given to the team and the members must determine goals, make decisions and resolve problems on their own [3].

The effectiveness of this leadership style has been proven in situations when:

- team members are highly skilled and experienced;
- team members have pride in their work;
- team members are trustworthy and experienced.

In opposition, this leadership style is ineffective when:

- it makes the team feel insecure under the leader command;
- the leader cannot provide regular feedback;
- the leader is unable to thank team members for their good work;
- the leader doesn't understand his responsibilities and is hoping the team can cover for him.

Considering the different leadership styles is supposed that each leader will adopt one of these and as a result, his actions will be influenced by his leadership style. Putting this in the context of ship operation, it can be observed that the safety of each operation which takes place onboard ship is dependent on the personality and behavior of the leading person. , This means that safety of the ship might depend on the persons in charge of leading of various operations onboard. In conclusion, according with the style adopted by the leader it possible to analyze what the safety level for each operation will be. Supposing the team is the ship crew, and the leader is the ship Master, we can talk about ship safety, and, as a direct consequence, the safety of navigation.

In the next chapter we will considered these styles to determine how many of the students involved in the study can be grouped in each of leadership styles and, also, to find how these aspects influenced the teamwork environment.

4. Maritime student's position towards teamwork abilities and leadership skills

Teamwork and leadership are components of human resource management and contributes to the global understanding of the ship safety concept. The importance of these skills has been recognized also by the IMO, which issued a recommendation about compulsory inclusion and study of these in the maritime training curricula. The IMO vision, expressed through the 2010 Manila Amendments to STCW Convention [1], made reference to the study of these especially at the management level, but is important to be mentioned at operational level too. As a general vision, all seafarers need to be trained about teamwork because it is a skill required at all activity levels and in teams composed of crew members from different departments and different levels of competency.

Taking into consideration the Manila Amendments requirements for deck and engine officers training in the field of teamwork and leadership, Constanta Maritime University has included in curricula references training for these fields of competency. During training students receive knowledge about teamwork principles and what it means to be a good leader. At the end of this training, students will be able to organize the team and to manage the team activity, understand basic principles about human personality and how it affects a teamwork activity, have knowledge about the minimum level of skills for a particular activity, know what competencies needs to possess the members of a designated team, know and apply the rules of a good leadership and to deduct and correctly understand what types of leaders there are.

During training there are opportunities to observe how the trainees comply with the training requirements and how they react in some situations, considered to be unusually. This is one of the reasons which stay at the origin of consideration that training is one of the best periods for development and improvement of the skills related to teamwork and leadership.

Starting from these considerations, a group of lecturers, including the authors of the present paper, have initiated a study to see how the students understand the teamwork principle and how they lead a team when are in a leader position, inside of ship bridge activities. This study used the classifications described before both for teamwork and leadership skills. Also, it used the simulation techniques for creation of the situations for student's behavioral study. Students from the last year of study, who have experience in working onboard ships, who have experience gained during the cadet practice, and who are very familiar with the shiphandling simulator, were invited to take part in the study.

During simulated exercises, teams of three students were used, each of them having a position on bridge, like Master, Officer on the Watch (OOW) and helmsman. From the beginning of the study it was stated that they will work as a team regardless of the positions they occupy. Thus, the student who takes the Master's position has to consider the team and act accordingly and not only command and supervise the bridge activities.

These positions were followed to see how the future officers understand the teamwork principles. It has been observed that there were some difficulties in adopting the necessary attitude during the exercises according with position occupied. Many students who took the Master's position felt that they are not able to satisfy the requirements of this position in a team context because they were trying to be exclusive a leader. This fact comes from a misunderstanding of team leader position versus a "supreme" leader, with the first situation supposing collaboration and communication with the team and the second situation supposing only order obeying and rejecting collaboration.

At the end of simulations, it was observed that the students were becoming open to the team concepts, they demonstrated an acceptance of team principles inside of ship bridge activities and an increased receptivity to new challenges for the team. Also observed was a changing of attitude toward team working, and some of the students who had some reservations at the beginning started to interact more and more with the team and to increase their involvement in team activities. It was more difficult to study how each student's personality affected the teamwork and how the personality is manifested according with the position occupied inside of the team. Anyway, without usage of a specialized study, might have observed that the personality of each student involved has an influence on the entire team activity. In this way, students with a more powerful personality have imposed their opinions more easily than those hesitant who were unable to communicate correctly their ideas or to convince their team colleagues about their intentions.

From the leadership point of view, in the study found what the student percentages for every leadership style are, and how they adhere to the principles and characteristics of these styles. The data analyze show that most of the students adopted the autocratic style, what that means is that they wanted to be treated as a real ship's Master and expected the team to execute what they ordered. In second place, was the democratic style. This situation can be considered as a result of friendly relationships between team members, the leader being a colleague with the other team members and finding it not necessary to be so authoritarian.

The entire image of the leadership styles adopted by the students during the studied situations, in percentages, is presented below, in figure 1.

Anyway, regardless of the leadership style adopted by the team leaders. all the exercises were completed and the targets were reached. The differences noted were about the time of completion, teams with autocratic leaders realizing better times than teams with laissez-faire leaders.

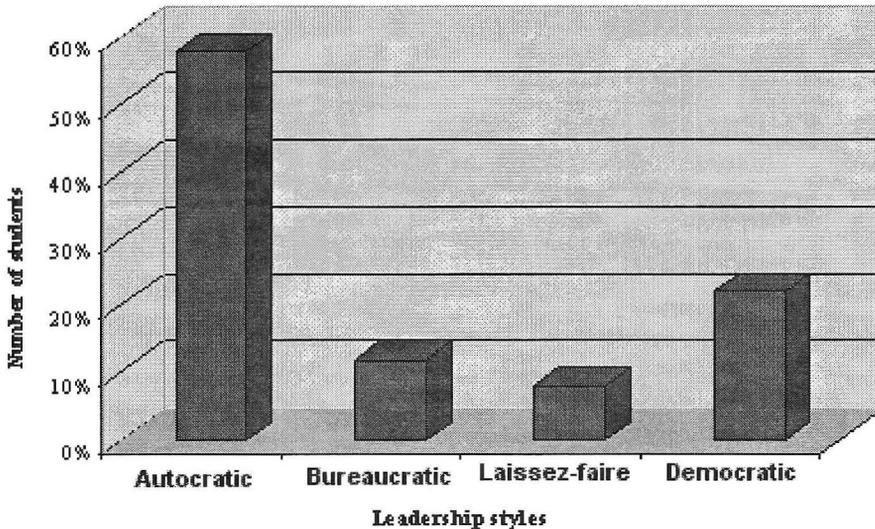


Figure1 Leadership styles adopted during simulations

The results obtained at the end of the study have allowed us to have an image of how our students will be as leaders on different type of ships. We don't appreciate this result as a general standard, but is important to known to illustrate in the future the aspects regarding the

teamwork and leadership to the students. It will be difficult to establish a better way to follow the matter of leadership style, or how to model the personality of a future maritime officer in order to interact naturally in a teamwork environment. Regarding the present state in the field of leadership in the maritime industry, the increasing number of autocratic leaders can be seen as a response to the actual style adopted by the Masters in ship leading.

The final result of the study have been presented to the participant students also, to let them to know and to possibly decide themselves about what they want to do in the future, what is necessary to be done related to their personality and teamwork behavior.

5. Conclusions

Every year accidents are the first cause of financial loses in the maritime industry. With all the investments and innovations to increase safety and accident avoidance, they are still presence, and main causal factor is the human factor. The last 30 years have been marked by studies and research in order to find the best way to increase the safety of navigation and to limit the human factor impact on it. Due to human factor complexity, this target is still far away. There are still problems which have to be solved before reducing the human factor impact to below the critical level.

In the great diversity of the human factor problems to be studied, teamwork and leadership are important ones. Both of them are part not only of the human factor, but, also are related to human resource management. This situation put them at the border between purely human factor study and management concepts of human resources.

In the present paper the authors tried to explain what the fundamental principles of teamwork concepts are and how these can influence, in a positive matter, the safety of the ship and of navigation. The teamwork is the most common form of organization activity onboard ship, and to be sure that the team reach the activity targets it is necessary to have a team leader, the person who organize and supervise the entire activity.

If humans have the capacity to work together the ability to lead other persons is a cognitive skill which has to be trained. Leadership is the skill to organize and lead people and to perform the requested abilities it in a good manner.

Not all persons have the same personality and the same life principles, so, the leadership style will depend on each individual. Leadership style is the characteristic which express how the team will be organized and conduct the activities and also, how will be the communication and brainstorming inside the team.

Onboard ships both teamwork and leadership are important to implement the ship's safety policies and we consider it essential to have knowledge about the abilities of the persons in charge related to these problems.

This study of teamwork and leadership can be seen as a small step toward a complete study about the future involvement of the human elements in activities with high impact on navigation safety. Teamwork and leadership are just a part of the aspects which have to be known in order to reduce the number of maritime accidents based on human factors.

In order to have a strong teamwork environment onboard ship is necessary to understand the human nature and how this can be influenced by different factors, like, individual personality, individual culture, nationalities interactions and opening to multicultural environments.

Any team will reach the targets with a good leadership. Like the teamwork, leadership also has factors which can influence the results.

Today, the international institutions with an interest in safety matters are paying more attention to the subjects of teamwork and leadership so it becomes more important to know all of the factors which influence both teamwork and leadership in the context of multicultural crews and the diversification of ships operations.

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